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AN EXAMPLE OF MODEL FARMING.

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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF PLANT INDUSTRY,
OFFICE OF THE CHIEF,
Washington, D. C., December 1, 1905.

SIR: In the Yearbook of the United States Department of Agriculture for 1903 was published an article entitled "A Model Farm." The demand for reprints of this article has been such that it has been deemed advisable to issue it with some slight changes as a Farmers' Bulletin in order that the methods pursued on the farm therein described may have the wide publicity afforded by this popular series of bulletins. Some writers, in commenting on the original article, have suggested that the term "model farm" implies a farm intended for show rather than for profit. In this reissue of the article the title has been modified to emphasize the methods rather than the farm itself.

Respectfully,

B. T. GALLOWAY,
Chief of Bureau.

HON. JAMES WILSON,
Secretary of Agriculture.

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AN EXAMPLE OF MODEL FARMING.

INTRODUCTION.

The methods of management on a 15-acre farm that raises all the roughage for 30 head of stock, 17 of which are cows in milk, can not fail to be of interest to farmers in all parts of the country. The farm in question is situated in southeastern Pennsylvania, near a large city. About 13 acres are in cultivation, the remaining 2 acres being occupied by buildings, yard, etc. This farm came into the possession of the present owner in 1881 with a mortgage of \$7,200 upon it. For the first year the farm lacked \$46 of paying expenses. During the next six years the mortgage was paid.

HOW THE SOIL WAS IMPROVED.

The soil of the farm is a reddish, somewhat gravelly clay. It was so run down in 1881 that it did not support the 2 cows and 1 horse kept upon it. It has been brought up to its present remarkable state of fertility solely by the use of stable manure applied directly from the barn, as it was produced. The system of handling manure is such that none is lost, either liquid or solid. No commercial fertilizers have ever been used, and no manure has been hauled from the city. The crops are (ordinarily) all fed, and are thus largely returned to the land in the manure. Of course much valuable fertilizer is added to the farm annually from the rich mill products fed the cows. The roughage is all raised on the farm, but all the grain is bought.

Upon assuming management of the farm the owner, a minister with no previous experience in farming, began to read what agricultural literature was available. One of the first books secured was Quincy's little book on the soiling of cattle, written early in the last century, and now very much out of date, there being much better treatises on the subject.

As in many parts of this country the practice of "soiling" is not common, it is permissible to state that it consists in cutting and feeding green feed in summer instead of allowing the animals to run on a pasture. This practice did not prove satisfactory the first year, because no other feed was used, and the cows did not do well. The manure was also difficult to handle, and it was not easy to keep the

barn clean. Before the next season the new farmer had procured Stewart's book on feeding animals,^a and from it learned his first lesson in "balanced rations." He also learned to feed some dry hay with the soiling crops, thus giving the manure a proper consistency. Thenceforward the management of the constantly growing herd of cows was a simple matter, and the farm began not only to pay a profit but to increase in fertility.

SYSTEMATIC MANAGEMENT.

The writer has never seen another farm on which system is so pronounced a feature. Without referring to notes of any kind, the owner detailed the crops growing on each small subdivision, the crops that had been grown on each for two to three years past, and those that would be grown for as long in the future. In most cases the dates of seeding and harvesting were given. A peculiar feature of the management is that each of the principal operations is performed on a fixed day each succeeding year, or as near to it as the weather will permit. Not a pound of solid or liquid manure goes to waste on this farm, and the soil is in such condition that it is more nearly independent of weather conditions than any other soil the writer has ever seen. Torrential rains are soaked up in a very short time, so that the soil may be handled after a rain much sooner than that of adjacent farms. It is therefore not difficult to adhere approximately to a prearranged programme. For instance, early corn for soiling is planted May 8; late corn for silage, June 22; grass seed about August 22, and so on.

THE PRODUCTS SOLD.

The farm is strictly a dairy farm, the only products regularly sold being milk and a few head of young cattle each year. The cows are all registered Jerseys, except one or two picked up at sales on neighboring farms. They are not only pure bred but they are well bred. There is not a star boarder in the herd. Male calves, if worthy of it, are reared for breeding purposes, but none is ever vealed. If a male calf is not fit to raise for a breeder it is killed at birth. "It doesn't pay to feed \$18 worth of milk to a calf that will sell for \$7," said the owner. The young cattle sold from this farm bring on an average \$100 apiece, and about five are sold each year.

The milk is all sold at 25 cents a gallon the year round to a State institution located 2 miles distant, in a neighboring suburb. It tests on the average 5.8 per cent. It will be seen that this is a very moderate price, considering the quality. It is superfluous to add that this milk is perfectly clean and free from adulteration. There is never

^a While Stewart's Manual is still a valuable book there are more recent books on feeding that every stockman should read.

any complaint from the buyers; on the other hand, this farmer is considered a public benefactor. The milk is delivered once a day, the wagon leaving the farm at 6.50 a. m. Both night's milk and morning's milk are scrupulously cared for the first hour after being drawn. As soon as drawn the milk is placed in perfectly clean cans standing in cold water some distance from the barn, and stirred frequently to aerate it and aid the cooling. The milk vessels are never allowed to stand around with a little milk left in them, but are washed as soon as the milk is removed from them, first with cold water, then with boiling, and finally again with cold water. "All buckets and cans about the dairy are treated to such a bath immediately after use and placed in the sunshine and air, and before use again cleansed with clean cold water."

The amount of milk produced is nearly the same at all seasons, and averages about 26 gallons a day. This is equivalent to a yield of 4,800 pounds a year for each of the 17 cows kept—not an enormous yield by any means, but a good one. This gives an income from milk of about \$2,400 a year. The outlay for concentrated feeding stuffs is about \$625 a year.

HANDS EMPLOYED AND METHODS OF WORK.

One man and a boy do the labor of the farm, except in hay harvest and during the cutting of silage; but these have all they can do. The owner does only such portions of the ordinary labor as can not safely be entrusted to hired help; but he plans all the work, and then sees that his plans are followed strictly. So systematic is the work that the owner may leave for a week without notice to his laborers, with no interruption to the regular routine. The feeding of the cows, the methods of handling the milk, of keeping the barn clean, and of disposing of the manure are all worked out so perfectly that they require very little supervision on the part of the proprietor. On a farm of this size, with such high-priced land, pastures are out of the question. There is not even a barn lot. The 30 head of stock remain in the barn the year round. We have been taught that this is not the best practice. It has been supposed that milch cows need a certain amount of exercise. But how much exercise do Danish cows have that stand in their stalls from November to May and are staked out in the field from May to November? Yet Denmark is a dairy country par excellence and her cows are healthy.

THE COWS AND THEIR FEED.

On the farm here described the bill for veterinary services during the past six years has been \$1.50, and this was made necessary by an accidental injury to one of the cows. One of the cows is 15 years old and is still vigorous and healthy; she breeds regularly, and gives milk

enough to make it profitable to retain her in the herd. A photograph of this cow is shown in figure 1, and her two-year-old daughter, a very promising cow, appears in figure 2. The writer has never seen a thriftier, better kept herd of cows. They are fed balanced rations every day in the year. Every feed consists of three parts. A portion of it is some succulent material—silage in winter; and rye, timothy and clover, corn, peas and oats, or some other green crop in summer. A second portion consists of dry hay or fodder. This is used to give the manure proper consistency and adds much to the convenience of caring for the cows. A third portion consists of mill products, of which three kinds are used—bran, oil meal, and gluten. The proportion of concentrates fed depends on the condition of the cow and is regulated by

the flow of milk and the consistency of the manure.

The soiling crops used are as follows: Green rye, beginning about May 1, and continuing about four weeks, or until the rye is ready to cut for hay. Then timothy and clover are fed till peas and oats are ready. When the latter is cut for hay, the silo is opened (about July 4), and silage is fed till early corn (planted May 8) is ready. Enough early corn is planted (about one-fourth acre) to last till late corn (planted about June 22) is ready. Late corn is then fed till it is time to put it in the silo. From this time forward silage is fed daily till green rye is available in the spring.

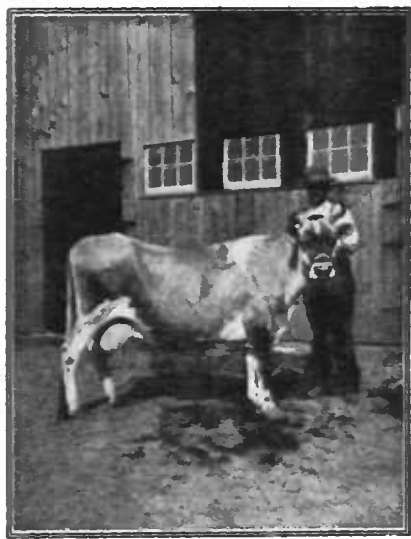


FIG. 1.—A 15-year-old cow, stall-fed since birth—still a profitable milker.

No abrupt change is ever made in the system of feeding. Even the change from green corn to silage is made gradually.

It will surprise most dairymen to learn that these carefully kept cows are given 4 ounces of salt each, daily, mixed with their feed. They eat their food better, and the owner thinks they do better when given this amount than when the allowance is smaller. The cows are fed three times a day, and the salt is divided between the three feeds. Fine table salt is invariably used; the cows prefer it to coarse salt.

Every particle of roughage fed on this farm, including hay and all soiling crops, is cut in quarter-inch lengths. Even the bedding is cut in this manner.

There are two round silos on the farm, each 10 feet in diameter and 34 feet high. These together hold about 100 tons of silage, and this

quantity of corn silage is produced on 4 acres, planted about June 22. Eleven men, three teams, and a traction engine to run the cutter are employed in filling the silos. Ensiling begins usually on Friday, so that the silage may settle over Sunday. On Monday the filling is completed.

CROPS AND MANAGEMENT.

There is no systematic rotation of crops on this farm. It is not necessary, since every foot of land receives an abundance of manure every year or two. The writer visited the farm late in April, and only three kinds of undesirable plants were to be seen. These were not weeds in the ordinary sense, for they did not interfere to any marked extent with the crops. In a three-year-old plat of timothy and clover, chick weed was more or less abundant. This, of course, disappeared when the grass began to grow vigorously a little later. In a two-year-old field of the same crop, dandelion was more or less abundant. In a small plat devoted to corn last year, and left for early corn this year, shepherd's-purse grew quite rank.

Every green crop grown on the place is utilized for soiling purposes, more or less, the surplus being converted into hay or silage. The crops grown are rye, timothy and clover, corn, peas and oats, and millet. At least two crops a

year are harvested from most of the fields. The grass crop is a mixture, the seed sown being as follows: Red clover, 6 quarts; timothy, 5 quarts; alsike, 2½ pounds; and redtop, 1 pound. The farm is divided into twelve small parcels, varying in size from one-fourth acre to 2¼ acres. In April, 1903, six of these (5 or 6 acres in all) were in grass. About half of this was sown the last week in August, 1900, one-fourth in 1901, and one-fourth in 1902. That sown in 1900 was cut once for hay in the spring of 1903, and then plowed for late corn. The crops which preceded these plats of grass were in two cases rye, grown the preceding winter; when this was cut for soiling or for hay the ground was plowed and harrowed into fine tilth. One and a half bushels per acre of German millet were then sown. This was cut for hay before it had made seed. The land was plowed



FIG. 2.—A 2-year-old daughter of the cow shown in Fig. 1.

again and harrowed into fine tilth. Grass seed was then sown broadcast, late in August. Sowing thus early, using no nurse crop, gives a full crop the next year. In fact, because of the remarkable state of fertility to which this formerly exhausted soil has been built up, three large crops are cut the next year after sowing grass in August. Two cuttings are made the second year. In the spring of the third season, if the crop promises to be abundant, a crop of hay is taken before breaking up the sod for late corn. If the grass crop is scanty, the sod is broken earlier for any crop for which it may be needed. The sod is always heavily top-dressed during the winter before it is broken up.

Some of the fields are kept in rye in winter and corn in summer, indefinitely. Rye is sown broadcast at the rate of 2 bushels per acre, the seed being covered by a spring-tooth harrow. The hay made from this rye is readily eaten by the stock, but a part of it is used for bedding. During the present season rye attained a height of 7 feet 11 inches. Three of the twelve subdivisions of the farm are thus devoted regularly to rye in winter and late corn in summer. Oats and peas are sometimes sown in early spring on land sown in rye the previous fall, the rye having been turned under in spring. Sometimes a piece of corn land is left bare during the winter and sown to oats and peas the next spring. Grass is occasionally sown on land from which soiling corn has been cut. One small field was devoted to oats and peas for several years and then put down in grass, to be followed by corn. Oats and peas do not fit very well into the cropping systems followed on any of these small fields. They must be sown in early spring, and are off early in July; yet they yield so large a quantity of such nutritious hay or soiling material that a small area is usually grown each year.

It is unfortunate that no records of actual yields are kept. But since the stock are all kept in the barn the year round, it is not difficult to estimate approximately the amount of dry matter in hay, silage, etc., the farm must yield. Estimating that 17 cows consume 16 pounds, 11 head of young cattle 10 pounds, and two horses 12 pounds of dry matter each daily in their roughage, the total amount of dry matter thus consumed is equal to that contained in 87 tons of hay containing 15 per cent moisture. This is equivalent to 6.7 tons of hay for every acre in cultivation on the farm. Not only did this farm produce all the roughage for 30 head of stock last year, but a surplus of 3,300 pounds of hay was sold. A small portion of this year's hay crop has also been sold.

The remarkable yields on this farm are due to the intelligent use of stable manure. Most farmers waste more than half the value of the manure produced on their farms. It is estimated that five-eighths of the plant food in the manure of farm animals is contained in the liquids. On this farm every particle of this plant food is utilized.

HANDLING THE MANURE.

The method of handling manure on this farm can be used only on farms on which stock is kept in stalls, and it is therefore not applicable to all styles of stock farming; but it is so unique, so perfectly systematized, and bears such an intimate relation to the success attained, that an account of the farm would be incomplete without a full statement of it. Behind each row of cows is a gutter 18 inches wide and 7 inches deep. These gutters have no outlets. They are thoroughly cleaned daily. (The whole barn is disinfected twice a week by a free use of creolin, and the interior is frequently white-washed.) When cleaned the gutters are sprinkled with ashes or dry



FIG. 3.—Method of spreading manure.

dirt to absorb what moisture may be present. During the day a quantity of absorbent, consisting of leaf mold, rotten sod, etc., is placed in them. Each gutter ends near a door. The manure is lifted from the gutter into a cart backed up to the door. The end of the gutter next the door is slightly lower than the other end. One man lifts the manure with a fork and places it in the lower end of the trench. A second man then lifts it into the cart. In this manner the liquid manure is all gotten into the cart. Finally, the fragments that remain in the trench are swept to the lower end and removed. The cart goes immediately to the field, and the manure is spread at once. (See fig. 3.) In summer it is spread on the land from which the soil-

ing crops are removed. In winter it is spread on the rye and grass fields—on the latter particularly when the ground is too soft to place it upon the rye fields. No manure is used on newly seeded grass lands, but the second and third year grass fields are top-dressed in winter. “We always have a place to put manure,” said the owner of this farm, and this is the secret of his large crops.



FIG. 4.—Field of rye on the farm in April.

Figure 4 shows a field of rye on this farm, while figure 5 shows a similar crop on exactly similar soil on another farm, the two views being taken within a few feet of each other.

CURING HAY.

Harvesting hay on this farm is an interesting process. The rank growth of the crops renders it necessary to move aside the swath cut before the machine can get at the next one. The method of curing is as follows: “The grass is cut in the afternoon. The first night’s dew never hurts it. Let it lie the

next day until noon. It is then put into curing cocks, which are made flat. These cocks are upset the next morning, and in the afternoon four of them are made into one weathering cock. Let it stand thus for one day; then haul to the barn or rick.”

CONCLUSIONS.

We have given the account of a pioneer farmer, starting in with no experience, but going to work in a methodical manner to learn what he could from the experience of others, making a careful study of surrounding conditions, and adjusting himself to those conditions. This farmer, by applying scientific principles and business methods, has blazed a path into a region of great possibilities. The most important lesson to be learned from his achievements is that, by applying such methods, it is possible to cause land to yield twice or three times as much as the present average from what are considered good methods.

Can this experience be duplicated on other farms? The answer to this question depends on the soil and the man who has the manage-

ment of it. It can not be done by the man who is not a student. Few men, indeed, could develop unaided a system such as that described, but there are many who can do it now that the methods by which it has been accomplished are common knowledge.

A very similar system may be developed on any dairy farm that dispenses with pastures. Where land is cheaper and the dairyman can afford pastures, the system would be radically different in summer, but not in winter; while altogether different methods are required on other than dairy farms.

The most important single feature of this farm, aside from the remarkably systematic way in which it is conducted, is the manner of handling the manure. The fact that the stock are all stabled the year round makes it possible to save all the manure, both liquid and solid, and apply it to the land.

Again, the fact that it is applied daily, as produced, insures that any leaching by rains shall carry the leached materials into the soil, where they are wanted. How much plant food is lost from fermentation after the manure is spread on the fields is not known. But the remarkable yields of every portion of this farm would seem to indicate that this method of handling manure is highly satisfactory.

That similar results as to yield of crops may be accomplished by the use of commercial fertilizers, combined with crops grown expressly for the production of humus, is shown by the experience of a number of farmers, particularly in the truck-growing districts. It may, therefore, prove possible to develop almost any type of farming to a point that will more than double present average yields if agricultural science continues to develop as rapidly during the next quarter of a century as it has during the last.

For obvious reasons the identity of the owner of this little farm was not revealed in the original publication. It may be of interest to the public to know that as the result of articles published in various agricultural journals, the owner found it necessary to sell the farm because



FIG. 5.—Field of rye on adjacent farm, within a few feet of the view shown in Fig. 4.

of the attention which it had attracted. Visitors became so numerous that the work of the farm could not be conducted in a satisfactory manner. There is, therefore, no longer any reason why this remarkable farmer should not receive the recognition which his work deserves. The farm here described was located at Flourtown, Pa., and was owned and conducted by Rev. J. D. Detrich. On giving up the small farm Mr. Detrich assumed the management of a large farm in another locality and is now engaged in developing it along lines similar to those followed at Flourtown.